

What is claimed is:

1. A method of applying and disconnecting an unavoidable load to a communications circuit, the method comprising:

gradually one of applying and disconnecting the unavoidable load to the communications circuit without data disruption.

2. The method according to claim 1, wherein said unavoidable load is presented by a monitor access, and said applying step comprises:

gradually applying a variable impedance element to the communications circuit;
connecting said monitor to the communications circuit; and

gradually removing said variable impedance element from the communications circuit such that said monitor is connected to the communications circuit without data disruption.

3. The method according to claim 2, wherein said disconnecting step comprises:

gradually applying said variable impedance element to the communications circuit;

disconnecting said monitor from said communications circuit; and

gradually removing said variable impedance element from the communications circuit such that said monitor is disconnected from the communications circuit without data disruption.

4. The method according to claim 2 or 3, wherein said variable impedance element includes at least one of a variable resistance element, a variable inductance element, a variable capacitance element, a variable mutual coupling transformer, and a variable mutual coupling distributed element.

5. The method according to claim 4, wherein said variable impedance element is variable photoresistor, and the applying step comprises:

- opening a relay which connects said monitor access to the communications circuit, such that no bridging loading of the circuit is presented;
- gradually illuminating said variable photoresistor and applying a bridged load on the communications circuit, said load reaching a maximum when a minimum photoresistance is obtained, said minimum photoresistance approximating a short;
- closing the relay, such that no effect on the bridged load is presented to the circuit due to said illuminated variable photoresistor having reached said minimum photoresistance, and connecting the monitor access to the communications circuit;
- removing gradually the illumination of said photoresistor such that the monitor access is completed to the circuit without disturbance, as the photoresistance reaches a maximum value in an absence of illumination.

6. The method according to claim 5, wherein the disconnecting step comprises:

- gradually illuminating the variable photoresistor and applying a bridged load on the communications circuit, said load reaching a maximum when said minimum photoresistance is obtained, said minimum photoresistance approximating a short;
- opening the relay, such that there is no effect on the bridged load that is presented to the circuit due to said illuminated variable photoresistor having reached said minimum photoresistance, and disconnecting the monitor access from the communications circuit; and
- removing gradually the illumination of the photoresistor until the monitor access is removed from the circuit without disturbance, as the photoresistance reaches a maximum value in an absence of illumination.

7. The method according to claim 1, wherein each direction of information flow in the communications circuit can be separately observed.

8. The method according to claim 1, wherein the communications circuit is a digital subscriber line (DSL).
9. The method according to claim 1, further comprising controlling the impedance versus time, of the variable impedance element.
10. An apparatus for applying and removing an unavoidable load to a communications circuit, comprising:
means for one of gradually applying and gradually removing the unavoidable load to a communications circuit;
means for controlling said gradual load means, such that the load is one of applied and removed without disruption of data to the communications circuit.
11. The apparatus of claim 10, wherein said load is presented by a monitor access, and said gradual application means is accomplished with a controlled variable impedance element including at least one of a variable resistance element, a variable inductance element, a variable capacitance element, and a variable mutual coupling transformer.
12. The apparatus according to claim 10, wherein the communication circuit includes at least one of a fiber optic data circuit, a wireline data circuit, and a waveguide data circuit.
13. The apparatus according to claim 12, wherein the wireline data circuit includes at least a digital subscriber line, a duplex transmission scheme, and modem means continuously adaptive to slow transmission media parametric changes.
14. The apparatus according to claim 11, wherein said variable resistance element includes at least one of:
a thermistor in operative proximity to at least one of a heater and a refrigerator;

a potentiometer communicating with a mechanical actuator;
an adjustable light source in operative proximity to a photoresistor;
a piezoelectric device communicating with a voltage source;
a controllable magnetic source communicating with a magnetoresistive element;
a guided acoustic wave source communicating with a mechanoreceptive element;
and
a field effect device communicating with a voltage source.

15. The apparatus according to claim 11, wherein said variable inductance element includes at least one of:

a first inductor communicating with a variable reluctance element operated by a mechanical actuator;

a second inductor communicating with a variable permeability element operated by a controllable saturating magnetic field; and

a third inductor communicating with a fourth inductor, in turn communicating with a variable impedance element.

16. The apparatus according to claim 11, wherein said variable capacitance element includes at least one of:

a variable capacitor communicating with a mechanical actuator; and

a variable capacitance device communicating with a controlling voltage source.

17. The apparatus according to claim 11, wherein said variable mutual coupling transformer includes at least one of:

a first mutual coupling transformer communicating with a variable reluctance coupling element operated by a mechanical actuator;

a second mutual coupling transformer communicating with a variable permeability coupling element operated by a controllable saturating magnetic field; and

a third mutual coupling transformer communicating with another inductor influencing coupling which is in turn terminated in a variable impedance element.

18. The apparatus according to claim 11, wherein said variable mutual coupling distributed element includes at least one of:

a first mutual coupling distributed element communicating with at least one variable reluctance element operated by a mechanical actuator;

a second mutual coupling distributed element communicating with at least one variable capacitance element operated by a mechanical actuator;

a third mutual coupling distributed element communicating with at least one variable resistance element operated by a mechanical actuator;

a fourth mutual coupling distributed element communicating with at least one variable permeability coupling element operated by a controllable saturating magnetic field;

a fifth mutual coupling distributed element communicating with another distributed element which is terminated at least at one end in a variable impedance element;

a sixth mutual coupling distributed element communicating with at least one variable capacitance device operated by a controlling electrical source;

a seventh mutual coupling distributed element communicating with at least one variable resistance element operated by a controlling electrical source.

19. An apparatus for applying and removing a monitor access to a communications circuit, comprising:

a variable photoresistor illuminated by a controllable light source;

a relay connected to said photoresistor;

a monitor amplifier connected to said relay;

wherein when said variable photoresistor is gradually illuminated and imposes a predetermined load on the communications circuit, said relay can be operated to connect said monitor amplifier to the communications circuit without data disruption.

20. An apparatus for applying and removing a monitor access to a communications circuit, comprising:

- a pair of variable photoresistors;
- a pair of resistors coupled to said pair of photoresistors;
- a monitor amplifier connected to said photoresistors and said circuit;

wherein when said variable photoresistors are gradually illuminated, said resistors in conjunction with said monitor amplifier impose a bridging load on the circuit, such that said monitor amplifier can be connected to said communications circuit without data disruption.

21. The apparatus for applying and removing a monitor access to a telecommunications circuit, comprising:

- a core of saturable magnetic material;
- a first wire or winding from a transmission line of the telecommunications circuit to be sampled;
- a second wire or winding from said transmission line equivalent of a sampling means;
- a third wire or tertiary winding to create a controllable static flux bias level in said saturable core;

wherein said first wire, second wire, and third wire all pass through said core;

a DC current source for producing a controllable DC current;

wherein when said DC current of a controllable amount is passed through said tertiary winding on the core, an imposed inductance on the transmission line can be gradually adjusted from near zero to a predetermined value, such that said monitor access can be applied to the communications circuit without data disruption.

22. A method of applying and removing a monitor access to a communications circuit, comprising:

- passing a first wire through a common core of magnetic material to form a winding in a transmission line of the communications circuit;

passing a second wire through said common core to form a winding in said transmission line equivalent of a sampling circuit;

passing a third wire through said common core to form a winding which is operative to create a controllable static flux bias level in said common core;

passing a DC current of a controllable amount from a DC current source through said third wire;

gradually adjusting an imposed inductance on the sampled transmission line from near zero to a predetermined value, such that said monitor access can be applied to the communications circuit without data disruption.